Lessons Learned on the SCAMPI Road to CMMI-Software Level 5
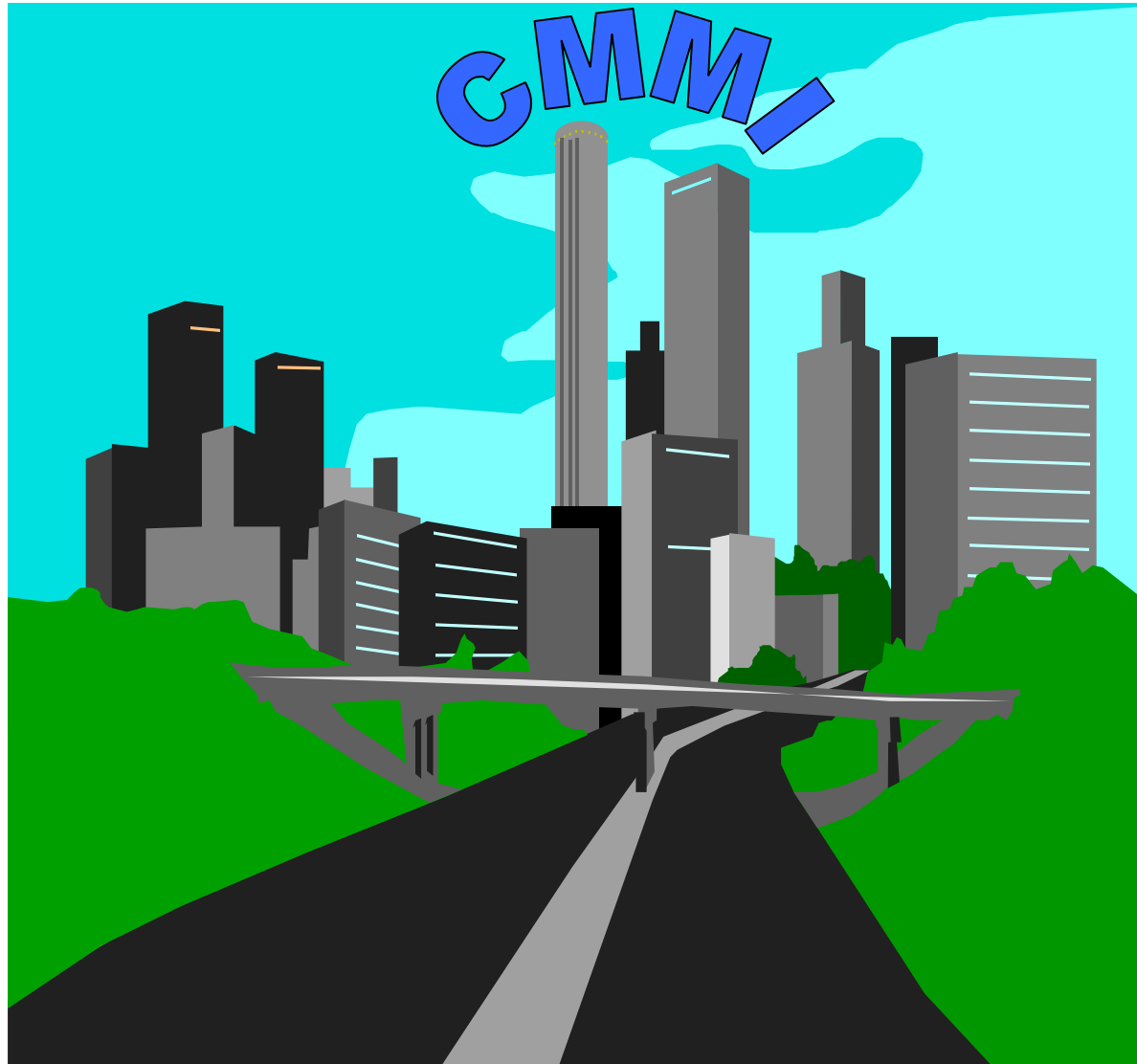
NDIA CMMI Technology Conference,
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– Formally assessed at Capability Maturity Model Integration (CMMI) **Software Engineering Maturity Level 5** and Systems Engineering / Program Management Maturity Level 3 on 15 December 2005.

  – The assessment was performed using the Carnegie Mellon University (CMU) Software Engineering Institute (SEI) CMMI **SCAMPI A** Appraisal method
  – Engineering and program management organizations were located **across three states**.

– The presentation will describe the planning and associated activities that led to this successful result and the lessons learned from those activities that were then **cycled into a continuing process improvement activity**.

Road to CMMI Software Level 5

BAE SYSTEMS

– We developed a database approach to the collection and control of CMMI artifacts which proved to be a valuable resource during the SCAMPI Assessment.

– BAE Systems Software had been previously assessed at CMM level 5, and we developed transition approaches to the more comprehensive CMMI representation.

What is SCAMPI ?

SCAMPI – What is it?

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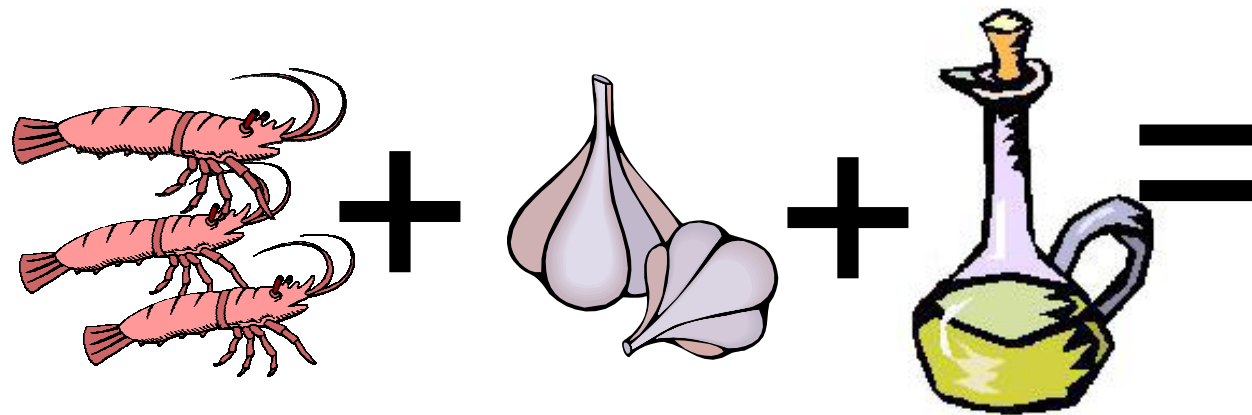
$$\neq \quad \textbf{SCAMPI}$$

Standard CMMI Appraisal Method for Process Improvement (**SCAMPI**)

- Ten member appraisal team
- The appraisal team was led by Ms. Marilyn Bush, co-author of the Software Capability Maturity Model
- Team had 4 Lead Assessors serving as members
- Team conducted 158 interviews
- Team reviewed over 800 technical and management artifacts
- Interviews with all engineering and program management organizations located spread across three states

Overview

- Current State
  - High Maturity Company
- Goal
  - Transition from SW-CMM to CMMI
  - Do not disrupt SW-CMM activities
  - Capitalize on experience obtained and infrastructure established with SW-CMMI

SW-CMM → **Leverage off Knowledge Gained** → **CMMI**

Staged

Top-Down

Bottom-Up

Continuous
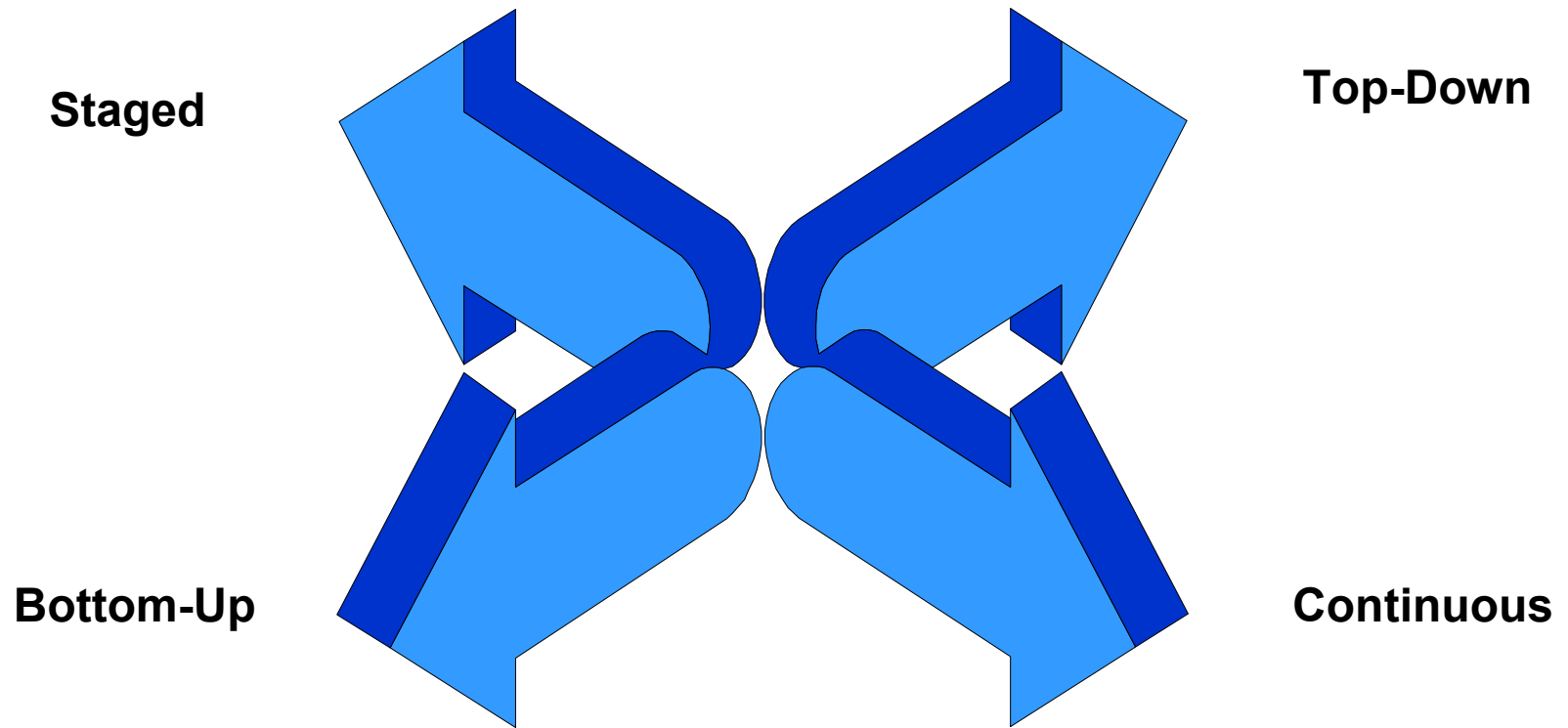
What Have We Learned?

- Capture How We Do Business
    - Processes should not be "wish lists"
    - Get Practitioners Involved
        - to increase the chances of compliance
- Make processes inclusive
    - Incorporate Tailoring, Links to Training Materials, Templates, Help Files
- Maintain process on Web for easy access
- Some processes already accepted by other disciplines - capitalize on that
- Process Team composed of practitioners
    - Avoid "Ivory Tower" effect
- Provide rapid response to update requests

Repeat What Works !

– Pick the CMMI Model that fits your culture
  – SW-CMM is staged - company is more familiar with this type of model
  – Use CMMI Staged
– Involvement and Communication Are Key
  – Cross-Functional Teams of Software, Systems, Programs, CM, Quality, etc.
  – SEPG Members intimate with how we became a high maturity organization are involved
  – Define a Core Team representative of all stakeholders
    - Core Team member on every mini-team
    - Cross-Functional Core Team to Oversee
    - Cross-Functional Mini-Teams write processes and develop organizational assets

– Look at What Already Exists
  – Some Software Processes already adopted by other disciplines
    - Expand those processes to encompass all appropriate disciplines
  – Review Software processes for potential to integrate other disciplines
  – Where expansion is not practical, have discipline-specific sub-processes
    - Maintain existing software processes as much as possible
  – Review Other Assets in the Software OSSP
    - They serve as good indicators for what type of assets will be required for CMMI
    - Templates, training materials, databases, etc.
  – Use Existing Software Infrastructure as a model

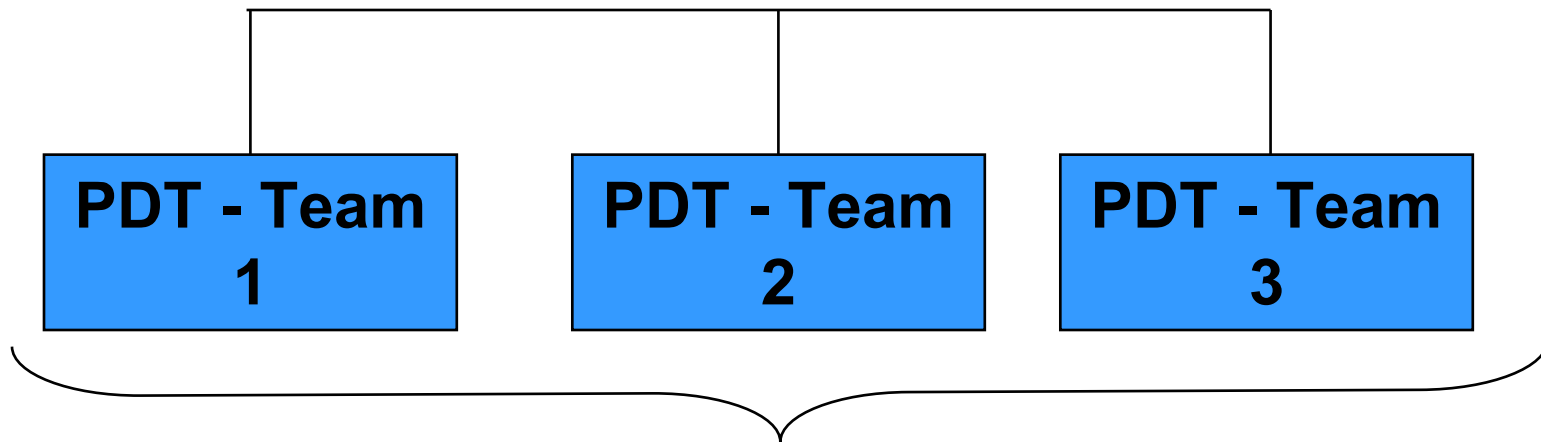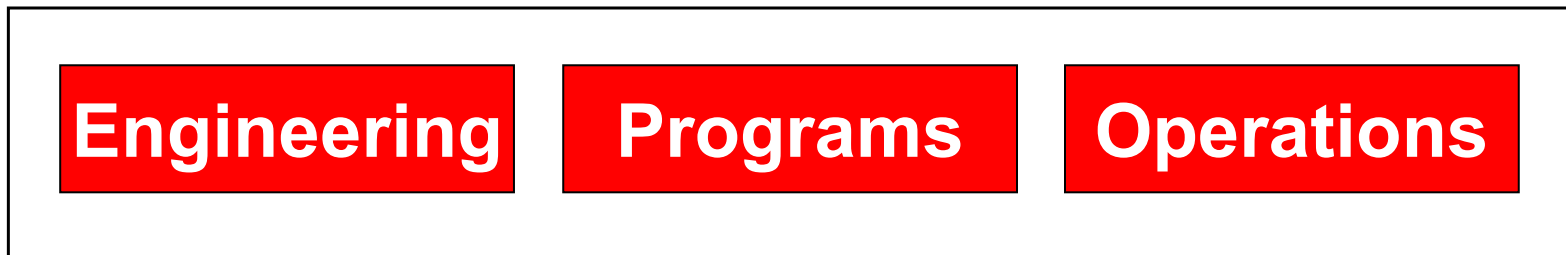*Don't Re-Invent the Wheel*

Transition Plan From CMM To CMMI (3)

– Strive Towards Fully integrated process assets and infrastructure across disciplines
  – Software, Systems, Hardware, Programs
– Integrated, inter-disciplinary Process Development Teams develop processes.
  – Templates, Training Materials, Help Files
  – Linked directly into process
– Perform Gap Analysis Between CMMI and our processes
  – CMMI Compliance verified via Peer Review Tester role as well as generation/maintenance of a DOORS cross reference matrix

BAE SYSTEMS

- A Process Steering Group (PSG) "Core Team" established to manage changes
  - Processes are integrated - must assess impact to other areas and update processes in concert
- Processes reviewed and approved by Core Team
- Processes/Process Assets on the Intranet for easy access
- Select projects for deployment based on where they are in the Life Cycle
- Process Deployment monitored and tracked against plan and corrective action taken as needed
- Process implementation monitored to determine process effectiveness and adjustments incorporated

Plan the Work and Work the Plan

BAE SYSTEMS

CORE Team

| Engineering | Programs | Operations |

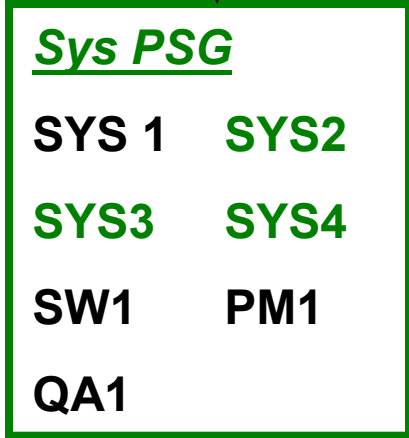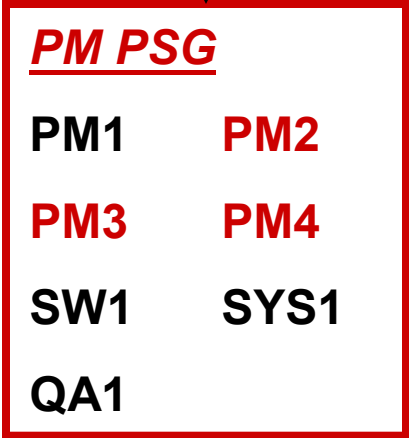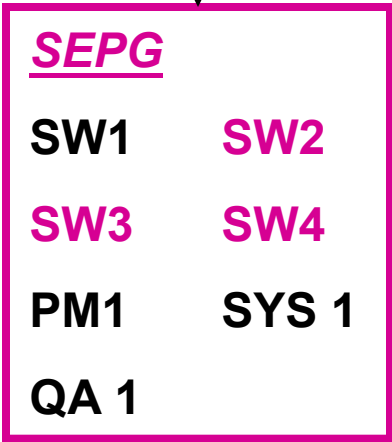| PDT - Team 1 | PDT - Team 2 | PDT - Team 3 |

Cross functional teams write the actual processes and supporting documentation.

Implementation Organizational Structure

A *"Core Team"* maintains consistency and ensures that changes in one area either don't impact or other disciplines or ensures that impact is communicated and addressed. They also control the global (common) site and global (common) processes.
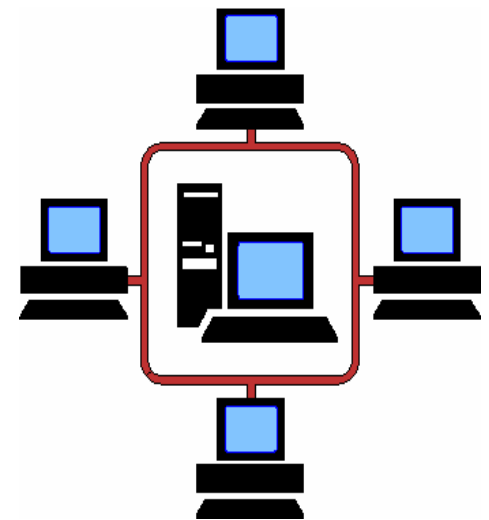
PSG

Core Team

SW1	PM1
SYS 1	QA1
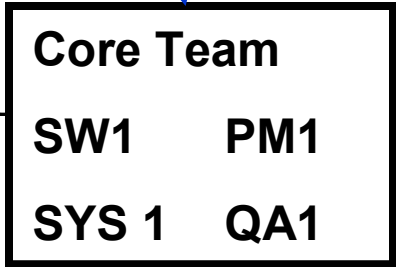
Individual PSGs deal with issues that impact their disciplines. Representation allows for impacts to be identified. They control their site and their unique processes

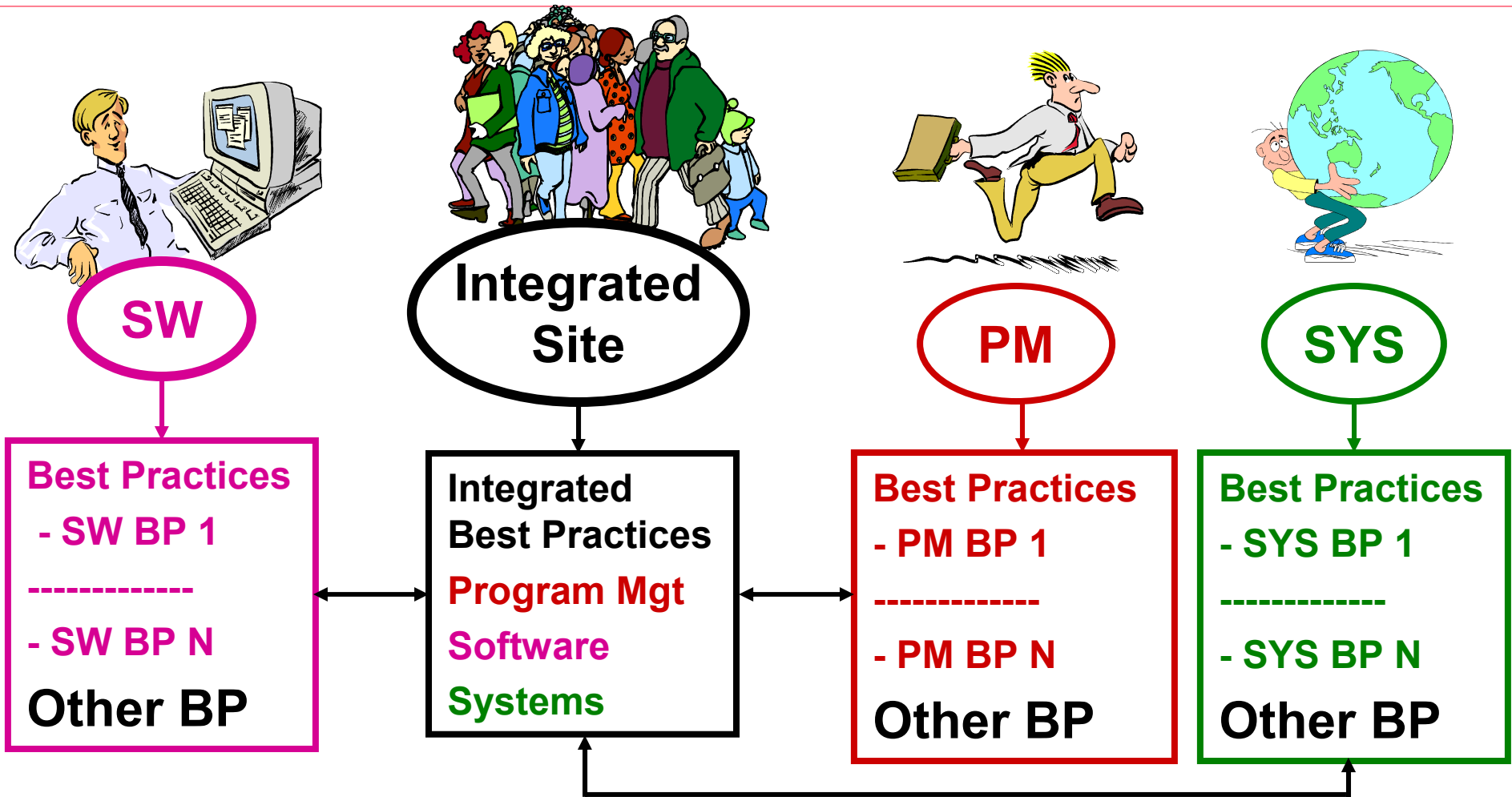**SEPG**

SW1	SW2
SW3	SW4
PM1	SYS 1
QA 1	

PM PSG

PM1	PM2
PM3	PM4
SW1	SYS1
QA1	

Sys PSG

SYS 1	SYS2
SYS3	SYS4
SW1	PM1
QA1	

Design of Web Site

– Establish/Maintain separate discipline sites

– Establish/Maintain integrated site

– Have bi-directional links between the 'specific" pages to the "integrated" page for an "integrated" OSSP

– Support multiple user view points

  – Users can get information by

    - Entering the site for their discipline

    - Entering through the "main" site

– Modularity allows for easy growth

  – Incorporation of other disciplines over time

  – Add new discipline Web site

  – Add links from "integrated" site to new site

  – Do not need to go to every existing site to add the new link, since all of the individual sites reference each other through the "integrated" page

Integrated Web Site Framework

SW

Integrated Site

PM

SYS

Best Practices
 - SW BP 1

- SW BP N
Other BP

Integrated
Best Practices
Program Mgt
Software
Systems

Best Practices
- PM BP 1

- PM BP N
Other BP

Best Practices
- SYS BP 1

- SYS BP N
Other BP

Multiple Entry Views Ensure You Find What You Want
Regardless of Where You Start.

## Data Storage Options

Separate

– Each discipline has its own database with local control
  – Database can be specifically tailored for each discipline
  – Difficult to keeping in concert
– Just provides needed discipline information
– Recurring work for each discipline
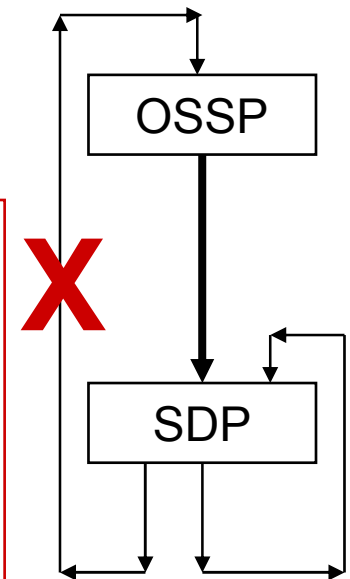– Generating global status is difficult

Integrated

– Single database with central control
  – Precludes discipline-specific tailoring
  – Eliminates synchronization issues
– Contains all discipline information - need to be able to sort on discipline
– No recurring cost - adding new discipline is relatively simply
– Can be set up to generate metrics per discipline and globally across all disciplines
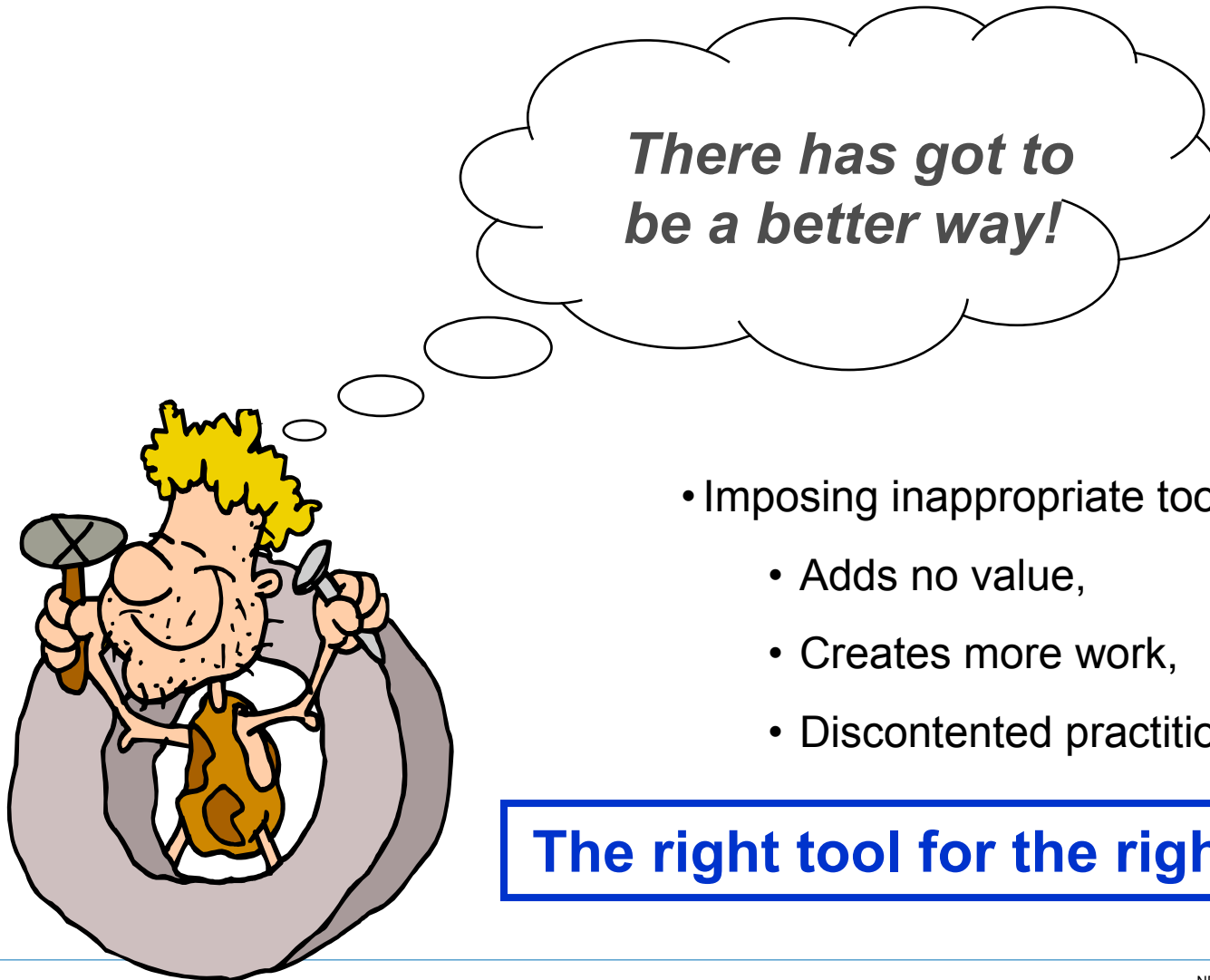
Lessons Learned

BAE SYSTEMS

It's MINE and YOU can't have it !
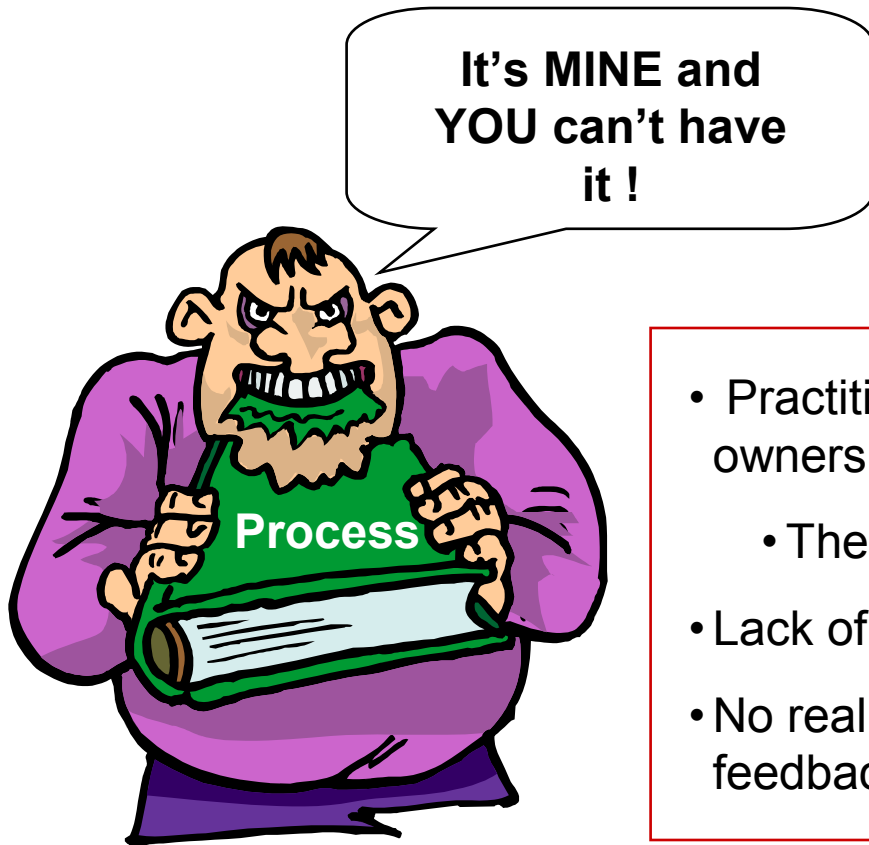
Process

- Practitioners do not feel they have ownership
  - They feel it is imposed ON them
- Lack of buy-in
- No real incentive to provide feedback

X

OSSP

SDP

Processes Need To Be Owned By The Practitioners

BAE SYSTEMS

KPAs ... Key Practices … OSSP … Managed Level.. Process Tailoring

I'm not sure what these things mean - but they sure sound impressive !

When you don't know what you are talking about – it shows

There has got to be a better way!

- Imposing inappropriate tools

  - Adds no value,

  - Creates more work,

  - Discontented practitioners

The right tool for the right job
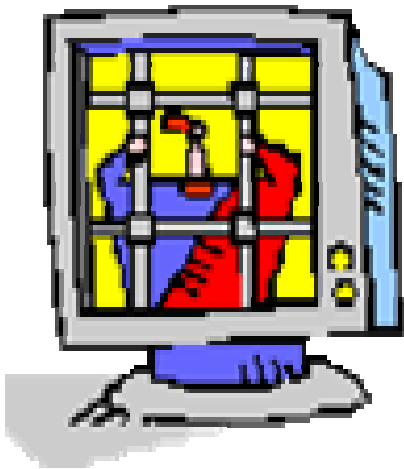
Static Processes
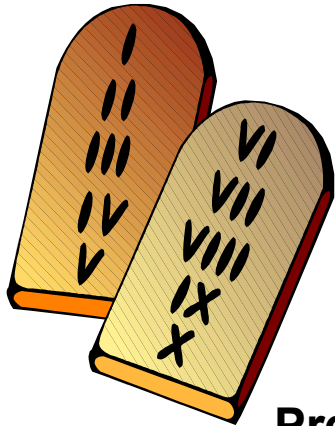
Premise 1: If a process is being used, the practitioner will naturally adapt it to the given situation

Premise 2: If the infrastructure is in place, practitioners will communicate these changes to the SEPG to make the processes better.

Conclusion: If processes are stagnant, either they are not being used or there is no path to allow change

If processes are being used, the practitioners will improve them over time

Having Processes That Are Overly Specific

- Processes cannot anticipate all possible situations

- Overly specific processes cannot be followed effectively across different projects
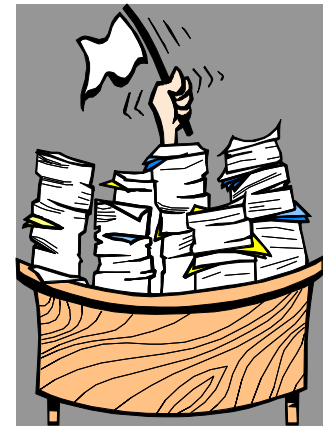
> *"One of the challenges of Level 3 is to build processes that 'empower' the individuals doing the work without being overly rigid."* **– Watts Humphrey**

- Makes it difficult/cumbersome to adapt to your project

- Complicates understanding

Tailoring guidelines should be clear and readily accessible

BAE SYSTEMS

ATM

Doesn't anyone else do anything around here?

ATM

- Overly "Hand-selecting" your best people as interviewees prevents some areas of improvement from being identified – hindering real progress

- The Assessment Team will wonder why the same people are interviewed 10 times in 20 interviews

Interviewee

Put your best foot forward – but remember the goal is improvement

How can you be FOLLOWING the process when you can't even FIND THEM ??
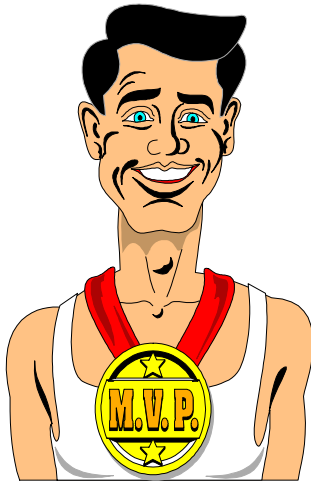
BAE SYSTEMS

Why Do You Do X?

- "Because the process says so"

- "I've never thought about it"

- "Because it's always been done that way"

If you don't know why you are doing something – FIND OUT

If it is not value-added, you shouldn't be doing it

BAE SYSTEMS
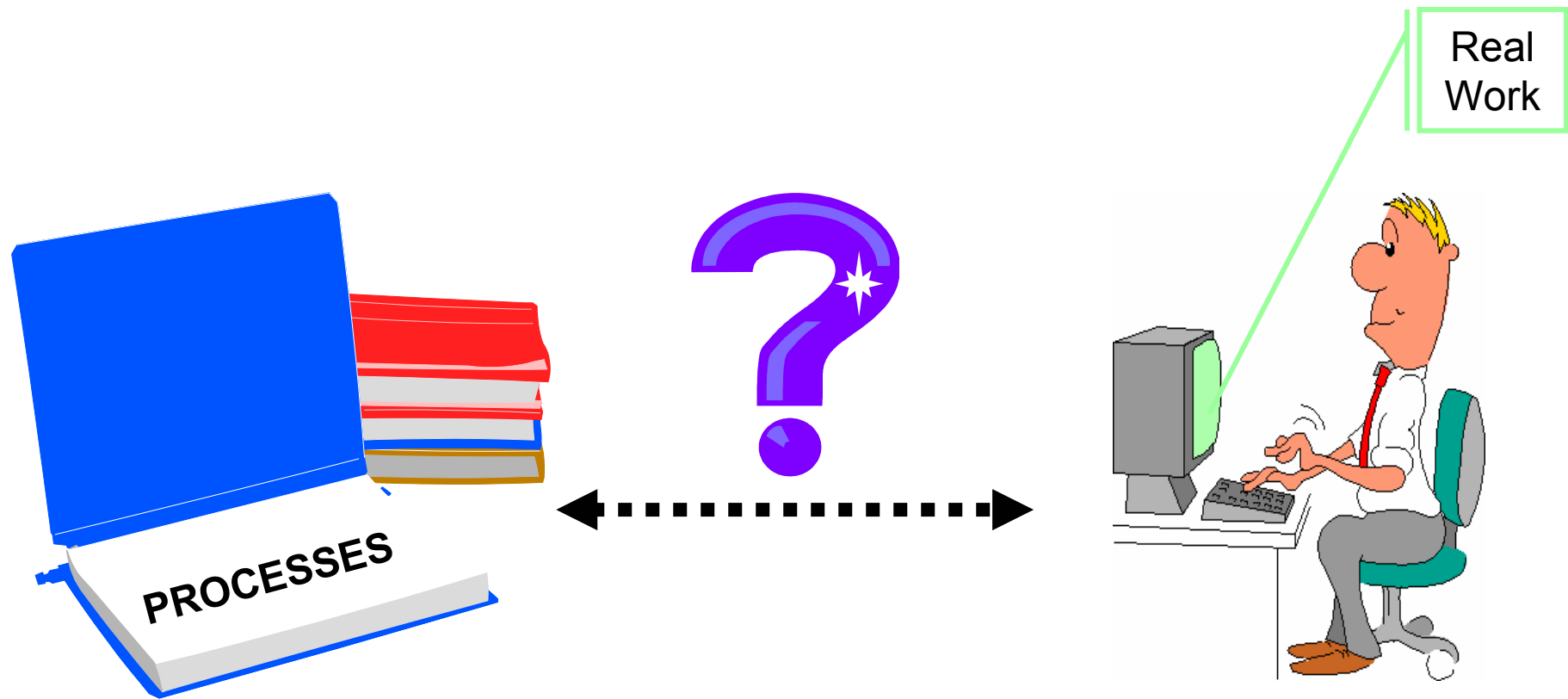
Inflating your
importance can lead to
credibility issues

*Importance Is Like Beauty - If you have to tell people,
you really aren't.*

Having a Poor/Ineffective Site Coordinator

- Distracts Team from focusing on their job

- Gives the first impression of an immature company

BAE SYSTEMS

Real Work

PROCESSES

If they are inconsistent – then you are not following the process – they are only for show
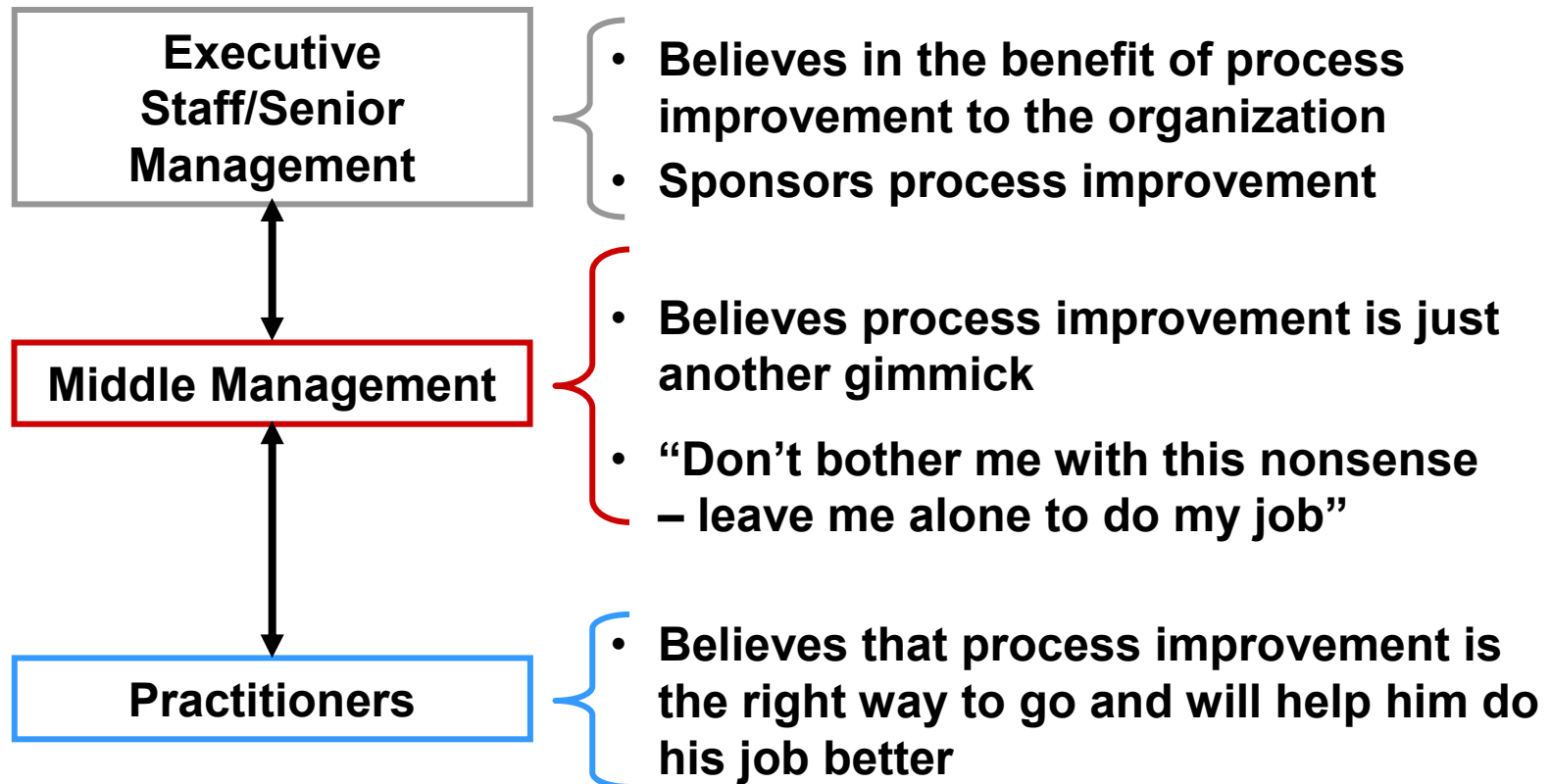
Having Inadequate Resources

- Appropriate tools are not provided

- Not enough people allowed to work on process improvement

- Training budget always overrun

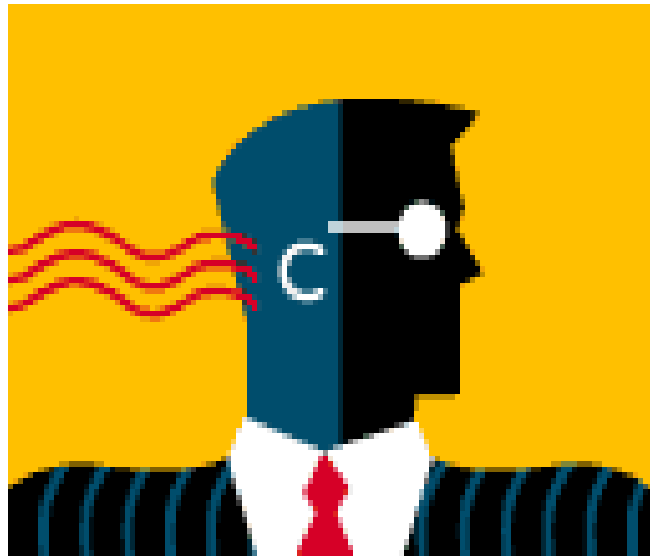- Insufficient budget to support needed activities

You need the appropriate resources to do the job properly

Executive Staff/Senior Management	• **Believes in the benefit of process improvement to the organization** • **Sponsors process improvement**
Middle Management	• **Believes process improvement is just another gimmick** • **"Don't bother me with this nonsense – leave me alone to do my job"**
Practitioners	• **Believes that process improvement is the right way to go and will help him do his job better**

CMMI has NOTHING to do with MY Job

Engage Brain BEFORE Opening Mouth

Concluding Remarks

- Successful assessments are a result of many factors
    - No one item will cause you to pass or fail
    - The overall picture you present to the assessment team will determine the outcome
- No Assessment runs perfectly – but you should maximize your chance of success by avoiding obvious pitfalls
    - Say what you do and do what you say
    - Know why you do what you do
    - Be honest about what you do
- Remember: goal of an Assessment is improvement